

Carbon cycling in the mixolimnion of Lake Kivu (East Africa)

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Lake Kivu is situated in the Western Rift Valley, and has unique limnological characteristics, as temperature and salinity increase with depth, due to bottom geothermal inputs. Due to its permanent meromictic nature, CO₂ concentrations are extremely high in Lake Kivu's bottom waters, similar to other "killer lakes" such lake Nyos in Cameroon. We obtained a data-set of inorganic carbon (pCO₂, pH, TA, DIC, DIC stable isotopes), CH₄, inorganic nutrients, organic carbon, bacterial production, and primary production in the mixolimnion of lake Kivu during the rainy season (March 2007), the late dry season (September 2007) and the mid dry season (June 2008). We show that the surface waters of lake Kivu were a source of CO₂ and CH₄ to the atmosphere albeit that the mixolimnion was net autotrophic at the community level, based on DIC mass balance budgets, sediment trap data and measurements of bacterial production and primary production. This rather unique situation is related to the important magmatic sources of CO₂ in the bottom of the lake.